

election as without traverse. The extent of the Examiner's authority is either to withdraw the restriction requirement or to deem it as final, subject to the Applicants' right to petition for reversal. Therefore, it is asserted that the examiner has improperly deemed the response to the restriction requirement as without traverse.

In addition, Applicants hereby request reconsideration of the restriction requirement. As previously argued, Applicants assert that the Commissioner may statutorily require the election of inventions only "If two or more independent and distinct inventions are claimed in one application." In the instant case the Examiner is alleging that the inventions of groups one and two are distinct, but absolutely no showing of such distinctness has been made. The Examiner's attention is directed to 37 C.F.R. 1.141(b) where allegedly different classes of inventions may be included and examined in a single application provided they are so linked as to form a single inventive concept. The claimed invention presents such a case. For these reasons, Applicants request reconsideration of the restriction requirement and respectfully urge that the restriction be rescinded.

With regard to the Examiner's statement that Applicants have failed to elect a species as required by paper no. 7, it is submitted that Applicants select Species I, drawn to claims 2-21, for consideration. Referring again to the response filed on May 24, 2002, Applicants mistakenly elected "Group I" rather than "Species I". It is hereby requested that this error be corrected, directing the election to Species I for claims 2-21 with traverse.

With regard to the Examiner's statement that Applicants failure to elect a species acts as an admission that the species are not patentably distinct. It is respectfully asserted that Applicants merely made a typographical error and that such is not an admission of any kind. It is further respectfully submitted that the Examiner's interpretation of this as an admission is improper. Applicants again submit that Species II is a sub-species of Species I, and that the election requirement is improper in its first instance. In sum, it is

submitted that the election of Species I for examination was made with traverse. Species I drawn to claims 2-21 is elected for consideration with traverse; and it is respectfully requested that each of these restriction/election requirements be reconsidered.

Claims 2-28 have been objected to as not being properly numbered. The examiner has requested that claim 20 be renumbered 2, etc. It is submitted that this requirement is inappropriate. 37 CFR 1.126 and MPEP 608.01 (j) require that the original claim numbering be preserved throughout prosecution. When an application is ready for allowance, the examiner should renumber the claims consecutively in the order in which they are to appear. Therefore this objection should be withdrawn.

The examiner has rejected claims 2-21 under 35 U.S.C. 103 over Jin (EP 08 49796) in view of Burns (U.S. patent 5,750,610). It is respectfully asserted that this ground of rejection is not well taken.

The claims are directed to a dielectric film produced by a process comprising the steps of **reacting a suitable silica film on a substrate**, with a surface modification agent to form a hydrophobic coating on said film and wherein the surface modification agent comprises at least one type of **oligomer or polymer** reactive with silanol groups on said silica film.

The examiner is correct that Jin et al. discloses dielectric materials comprising an organic silica dielectric on a surface. Jin, et al's surface may be rinsed with a monomeric material such as hexamethyldisilazane (HMDS) to render the pore surfaces hydrophobic. As admitted by the examiner, Jin fails to teach a surface modification agent which is a oligomer or polymer. Their reaction with HMDS caps the silanols by forming trimethylsilyl groups which are significantly less polarizable than the original silanols of the silica, and render the pore surfaces of the film hydrophobic. This is disadvantageous because the use of trimethylsilyl groups are not very thermally stable and may out-gas during processing of interconnect structures and cause via poisoning.

The Examiner has applied Burns, et al to allegedly fill these deficiencies in Jin et al. Burns also teaches the formation of hydrophobic organosilicate modified silica gels. However, Burns, et al fails to teach a film on a substrate and importantly fails to teach or suggest an **oligomer or polymer** reactive with silanol groups on any such silica film.

The agents used by Burns, et al have the Formulae (I) or (II) on column 3, lines 25, et seq. and are enumerated on col. 6 line 3 through 52. Please note that both the generic formulae and each individual species pertains to a **monomer**, not an oligomer or polymer and certainly not an oligomer or polymer reactive with silanol groups on a silica film. The examiner apparently believes that because some of these are mentioned to be high molecular weight, that they are thereby construed to oligomers or polymer. This is not the case.

In addition, Burns, et al does not teach a silica film **on a substrate**, the surface of which silica film is to be hydrophobized. Rather Burns, et al form a reaction product of a silica with an organosilane and a strong acid in a flask (see examples), to provide a hydrophobized reaction product. Such does not pertain to a coating on a substrate at all. Therefore Burns is to be considered non-analogous art to the modification of dielectric films on a substrate.

It is further respectfully submitted that there is nothing in the art to either teach or suggest to one skilled in the art to modify Jin's hydrophobizing process by replacing the hexamethyldisilazane hydrophobizing agent with the agents of Burns to arrive at the claimed invention. Jin, et al's film may be rinsed with hexamethyldisilazane (HMDS), modifying the pore surfaces of the silica film and rendering them hydrophobic. On the other hand, Burns teaches the formation of a hydrophobic organosilicate-modified silica gel composition wherein the silica composition is first heated in a strong acidic environment to form a hydrogel, followed by contacting the hydrogel with a strong acid and an organosilicon compound to render the composition hydrophobic.

Therefore, each of Jin et al and Burns teach the formation of different materials using different processing steps that result in a different final product. An invention cannot be deemed unpatentable merely because, in a hindsight attempt to reconstruct the invention, one can find elements of it in the art; it must be shown that the invention as a whole was obvious at the time the invention was made without knowledge of the claimed invention. When selective combination of prior art references is needed to make an invention seem obvious, there must be something in the art to suggest that particular combination other than hindsight gleaned from the invention itself, something to suggest the desirability of the combination. *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 5 U.S.P.Q.2d 1434, 1438 (CAFC 1988). Such a suggestion is absent in the cited references. There is nothing in the applied art that would lead one skilled in the art to combine the cited references to arrive at the amended claims.

To summarize, the invention provides a dielectric film produced by a process comprising the steps of reacting a suitable silica film on a substrate with a surface modification agent to form a hydrophobic coating on a surface of the film. The surface modification agent comprises at least one type of **oligomer or polymer reactive with silanol groups on said silica film**. The oligomer or polymer coating on the film surface eliminates the tendency of the film to absorb moisture and strengthens the mechanical properties of the film by overcoating and binding together the fine particles or grains that make up the film. This hydrophobic coating is formed upon contact with the surface of a silica dielectric film. None of these features are taught or suggested by either of the references, either alone or in combination. Therefore, it is respectfully submitted that the rejection should be withdrawn.

The examiner has rejected claims 22-28 under 35 U.S.C. 103 over Jin (EP 08 49796) in view of Burns, et al (U.S. patent 5,750,610). It is respectfully asserted that this ground of rejection is not well taken. The arguments for Jin and Burns, et al are repeated from above and apply equally herein. Neither of these applied references teach or suggest an integrated circuit comprising at least one dielectric silica film treated by reacting said

silica film with a surface modification agent, wherein said reaction is conducted under conditions and for a period of time sufficient for said surface modification agent to form a hydrophobic coating on a surface of said film, and said surface modification agent comprises at least one type of oligomer or polymer reactive with silanol groups on said silica film. For these reasons and for the reasons argued for the rejection of claims 2-21 above, it is submitted that the rejection has been overcome and should be withdrawn.

The examiner has rejected claims 2-28 under the non-statutory, judicially created doctrine of obviousness-type double patenting over claims 1-19 of U.S. patent 6,318,124 (Rutherford et al.) in view of Burns. It is respectfully submitted that the rejection is not well taken.

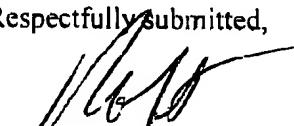
Rutherford et al. discloses a surface-coated nanoporous silica dielectric film in which a polymeric layer is deposited onto a silica dielectric film on a substrate. Rutherford, et al then may apply a **monomeric** surface modification agent such as those enumerated on column 8, lines 15, et seq. The surface of the nanoporous silica dielectric film is then coated with a polymer layer. However, none of the claims indicate that their surface modification agent is an oligomer or polymer *reactive with silanol groups* on a silica film. The Rutherford, et al coating materials are different than the surface modification agents within the scope of the claimed invention and do not form coatings on silica dielectric films as the claimed films in which surface modification agents which are **oligomer or polymer reactive with silanol groups on said silica film** and form a hydrophobic coating thereon.

Burns also does not teach or suggest a surface modification agent at all, much less one which is an oligomer or polymer reactive with silanol groups on a silica film. Regarding, Burns et al., the arguments from above are repeated herein. There is nothing in said reference that would teach or suggest to one skilled in the art to combine the references to arrive at the claimed invention. Particularly, Burns et al. teaches the formation of a composition in a flask, and not the surface modification of a dielectric film on a substrate.

Burns, et al does not teach the use of a oligomer or polymer reactive with silanol groups. Burns further requires certain steps to be conducted in the presence of a strong acid and relates to a non-analogous art, i.e. reinforcing fillers in organic and silicone rubber compositions, as thermal insulation, and as fillers in floatation devices. It is respectfully asserted that it would not be obvious to one skilled in the art to look a non-analogous art, i.e. an art having absolutely nothing to do with dielectric materials or films, to combine with Rutherford et al. to arrive at the claimed invention. For these reasons, it is respectfully submitted that the double patenting rejection is improper and should be withdrawn.

The undersigned respectfully requests re-examination of this application and believes it is now in condition for allowance. Such action is requested. If the examiner believes there is any matter which prevents allowance of the present application, it is requested that the undersigned be contacted to arrange for an interview which may expedite prosecution.

Respectfully submitted,

  
Richard S. Roberts

Reg. No. 27,941

P.O. Box 484

Princeton, New Jersey 08542

(609) 921-3500

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Richard S. Roberts

Reg. No. 27,941